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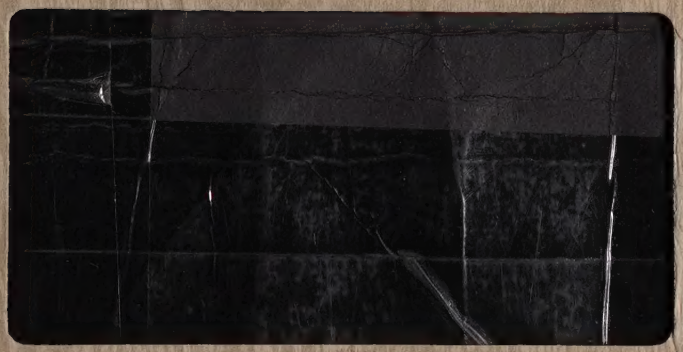
PROPERTY OF ENGINEERING
TEST COLLECTION
ITEM 1 COPY 1
48 HOUR LOAN



NEW LONDON INSTRUMENT CO. INC.

NEW LONDON, CONNECTICUT

GROUND COMMUNICATIONS SECTION

SER# 185

CROSLEY # 3821

RCVD 1-30-58

INSTRUCTION MANUAL

F. M. SIGNAL GENERATOR

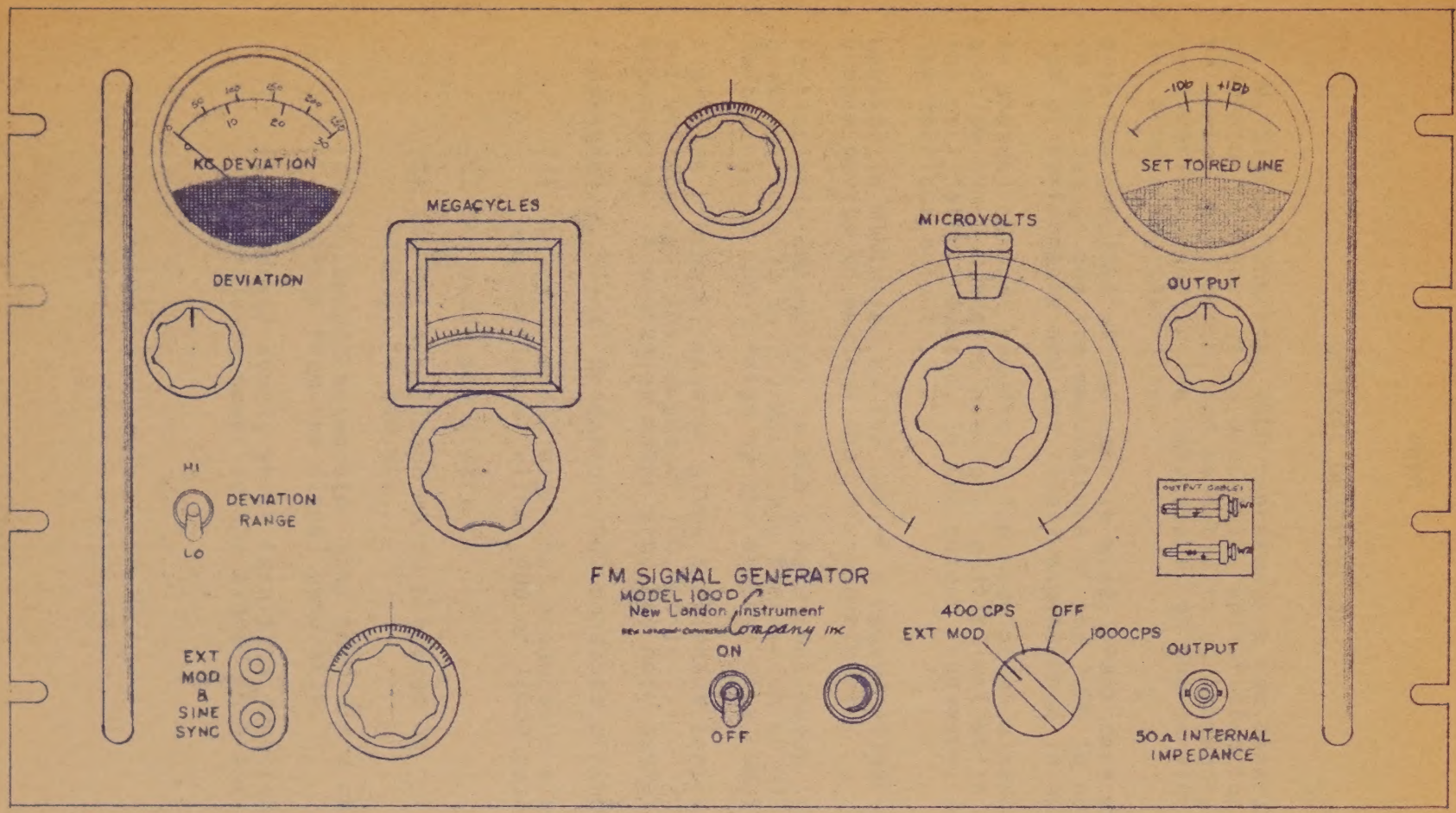
MODEL 100 D

PROPERTY OF ENGINEERING
TEST CONSTRUCTION
ITEM 1 COPY 1
48 HOUR LOAN

Manufactured by

NEW LONDON INSTRUMENT COMPANY, INC.

NEW LONDON, CONNECTICUT



SIGNAL GENERATOR MODEL 100 D

FRONT VIEW

PART I

GENERAL DESCRIPTION

F. M. Signal Generator 100D represents a new departure in signal generator design. It is especially well fitted for testing the alignment, band width, and sensitivity of frequency modulated receivers--either in the laboratory, on the service bench, or on the production test line.

With the problems of the user in mind, great care was taken both in the design and the manufacture of the 100D to achieve precision of performance and yet retain convenience in operation.

An unusual circuit results in low modulation distortion, low A.M. and low hum. Since no mixing or multiplication is used, and since the oscillator frequency is the output frequency, there are very low spurious outputs.

Leakage is minimized by the use of a heavy, silver-plated cast bronze cavity to enclose the r-f compartment.

Particularly convenient is the single continuous tuning range covering from 27 to 230 MC. This feature which eliminates band switching, is facilitated by the absence of a reactance tube.

A precise piston attenuator gives continuous control of the output voltage over the ranges of 100,000 to 0.1 or 20,000 to 0.2 microvolts. A deviation meter provides easy deviation setting.

Functionally, Signal Generator 100D consists of the following:

(1) An audio oscillator that produces a sinusoidal oscillation at either 400 or 1,000 cps.

(2) An audio amplifier.

(3) An r-f oscillator which produces an r-f output from 27 to 230 mc.

(4) An output attenuator that provides a calibrated output from the signal generator.

(5) A power supply which furnishes electronically regulated power to the signal generator.

SPECIFICATIONS

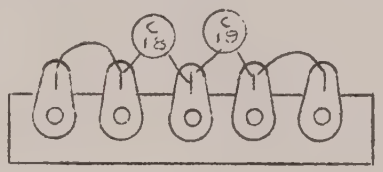
Frequency range	27-230 mc. ± (½% + 0.2 mc.) Single tuning range; errorproof dial.
Output	Unmodulated or frequency modulated.
Internal modulation frequencies	400 and 1,000 cycles.
External modulation	100 to 15,000 cycles.
Leakage	Very low. Cannot be measured with 0.1 microvolt detector.
Output cables	W1: 25 ohms self-impedance with binding posts. W2: 9 ohms self-impedance with BNC fitting, mates with UG-290/U. Cables terminated at both ends to reduce mismatch reflections.
Panel connector	Mates with BNC UG-88/U.
Generator self-impedance without cables	50 ohms.
Output voltages	With W1 cable, 100,000 to 0.1 microvolts with W2 cable, 20,000 to 0.02 microvolts.
Spurious frequencies	Harmonics of oscillator only. No other spurious outputs.
Attenuator	Piston type, accuracy ± 10% to 1 microvolt with W1 cable, lower with W2 cable.
Incremental frequency dial	± 100 kc
Modulation distortion	2% at 250 kc at 1,000 cycles, with external oscillator, proportionately less for lower deviations.
Frequency deviation	Two ranges, 0 to 5 kc and 0 to 30 kc. Deviation calibration ± 2% of full scale at 1,000 cycles at 100 mc.
Tubes	12AU7, 6AR5, 6C4, 6AV5, 6BH6, 6AX5, 5651, 6AS5, 6T4 (2).
A-C Inputs	105-125 volts, 50-60 cycles, 75 watts. 210-230 volts, 50-60 cycles, 75 watts.
Weight	45 lbs.

PART II

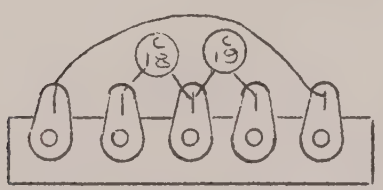
INSTALLATION

Signal Generator 100D is complete in one portable unit and is ready for use upon delivery. No permanent or special installation procedures are necessary. The following steps should be taken before operation.

a. The unit, as shipped, is connected for 115V operation and is supplied with a 2 ampere fuse. To change operation for 230 VAC input, change the jumper on power transformer primary connection strip as shown below:



115 VOLTS



230 VOLTS

When connected for 230V operation the primary fuse may be reduced to 1 ampere.

b. If an output voltage range from 0.1 volt to 0.1 microvolt is desired, connect r-f cable assembly W1 to OUTPUT, Jack J3, located on the right side of the signal generator.

c. If an output voltage range from 0.02 volt to 0.02 microvolt is desired, connect r-f cable assembly W2 to J3.

CONTROLS AND THEIR FUNCTION

a. The following table lists the controls of Signal Generator 100D and indicates their function:

Control	Function
Megacycles tuning control	Controls the r-f output frequency of the Signal Generator set by varying both the oscillator tank capacitance and inductance. The tuning dial is calibrated in mc.
Attenuation control MICROVOLTS	Controls output voltage of signal generator. The Attenuation dial is calibrated in uv.
Modulation switch	Permits selection of internal modulation at 400 or 1,000 cps, or external modulation. In the OFF position, the carrier is unmodulated.

Control	Function
DEVIATION control	Controls frequency deviation of r-f oscillator. The meter directly above this control indicates the frequency deviation in kc.
HI-LO METER RANGE switch	Selects KC DEVIATION meter range. In LO position, the meter reads a maximum frequency deviation of 5 kc. in HI position, maximum deviation is 30 kc.
Meter Set Control OUTPUT	Adjusts plate voltage of r-f oscillator tube V3. Before taking a reading on the attenuation dial, this control must be adjusted so that the pointer of the RF Output meter coincides with red line.
Power switch	Connects the signal generator set to AC power source when in ON position.
Fine tuning control	Permits fine adjustment of r-f oscillator frequency; located below and to the left of the Megacycles tuning control.
Delta frequency dial	A dial allowing incremental adjustment of the calibration frequency plus or minus 100 kc. This control facilitates exact tuning for narrow band F. M. applications and makes it possible to easily plot the static characteristics of discriminators and similar devices. It is a smooth vernier which shifts the carrier frequency by electrical means.

b. The following controls are inside the cabinet and are preset screwdriver slot type potentiometers:

Control	Function
R-f meter calibration	Calibrates RF OUTPUT meter.
Voltage set	Controls output voltage of regulated power supply.
HI meter set	Limits current through deviation meter in HI position of METER RANGE switch.
LO meter set	Limits current through deviation meter in LO position of METER RANGE switch. (Note: Always adjust LO range before adjusting HI range. HI range setting is affected by LO range control.)

PART III

OPERATION

CAUTION: Haphazard operation or improper setting of the controls can cause damage to electronic equipment.

Preliminary Set the front panel controls as follows:

Control	Position
DEVIATION	Full counterclockwise position
OUTPUT	Full counterclockwise position
Delta Frequency Dial	Center or "0" position
Modulation Switch	Off
Power Switch	Off
DEVIATION RANGE Switch	HI

Starting: Connect the power cable to the AC power source. Turn on the signal generator by throwing the power switch to the ON position. Allow one-quarter hour for warm-up.

Operation:

a. Rotate the MEGACYCLES tuning dial to the desired frequency. Use the fine tuning control for fine adjustment.

b. Turn OUTPUT control until pointer on r-f meter coincides with red line.

c. Set modulation switch to desired modulation frequency.

d. Throw METER RANGE switch to LO for deviation from 0 to 5 kc and to HI for deviation from 0 to 30 kc.

e. Adjust DEVIATION control to required frequency deviation on KC DEVIATION Meter.

f. The r-f output now can be set by means of the MICROVOLTS dial, which is calibrated in microvolts.

g. The actual voltage applied (E_L) to the load is not necessarily the same as the voltage indicated (E_{IND}) on the MICROVOLTS dial. To determine E_L in uv, refer to the following table:

CABLE	LOAD IMPEDANCE ZL
(r-f cable assembly W1)	(Greater than 250 ohms $E_L = E_{IND}$)
(Use 50 ohm calibrating hairline)	(Less than 250 ohms $E_L = \frac{Z_L}{Z_L + 25} \times E_{IND}$

CABLE	LOAD IMPEDANCE ZL
(r-f cable assembly W2)	(Greater than 100 ohms $E_L = E_{IND}$
(Use 10 ohms calibrating hairline)	(Less than 100 ohms $E_L = \frac{Z_L}{Z_L + 9} \times E_{IND}$

R-F OUTPUT CABLES

R-f cable assemblies W1 and W2 transfer the output of Signal Generator 100D to the equipment under test. Two cables are used so that two output voltage ranges are available. These cables must match the characteristic impedance of the flexible coaxial cable that connects Z5E to J3. If the r-f cables are not terminated properly, unpredictable resonance effects will cause erratic operation of the signal generation. Because of the cable terminations, the voltage (E_L) applied to the load (Z_L) is not necessarily the same as the voltage (E_{IND}) indicated on the ATTENUATION dial.

a. R-F ASSEMBLY W1. This cable is used when a voltage range of 0.1 volt to 0.1 uv is desired. It is represented by a 51 ohm resistor in parallel with load Z_L. The signal generator set without the cable can be considered as a constant voltage generator in series with a 50 ohm resistor. The ATTENUATION dial indicates E_{IND} ($\frac{1}{2}$ the voltage of the equivalent constant voltage generator). Therefore, according to Ohm's law,

$$E_L = \frac{Z_L}{Z_L + 9} \times E_{IND}$$

When Z_L is greater than 250 ohms, the difference between E_{IND} and E_L is negligible for all practical purposes.

b. R-F CABLE ASSEMBLY W2. This cable is used when a voltage range of 0.02 volt to 0.02 uv is desired. It is represented by two series resistors of 39 ohms and 10 ohms. The load is connected across the 10 ohm resistor. Using the same reasoning as in the preceding sub-paragraph, the actual voltage supplied to the load is given by:

$$E_L = \frac{Z_L}{Z_L + 9} \times E_{IND}$$

When Z_L is greater than 100 ohms, the difference between E_{IND} and E_L is negligible.

When making precise measurements, it is necessary to account for hysteresis (electrical backlash) effects in the modulating circuit. This can best be done by rotating the incremental dial from 100 kc to - 100 kc several times, thereby cycling the magnetic structure. Rotation should then be started from one end in the direction of the arrow. This is not necessary for general applications.

PART IV

MAINTENANCE

This section contains information for repair and maintenance of the Model 100D Signal Generator. It includes voltage and resistance charts, a list of replaceable parts, and an overall equipment schematic.

The Table of Replaceable Parts shows only those items recommended for in-the-field replacement. A replacement of critical items such as the tuning mechanism or the rf oscillator should be referred to the manufacturer.

To remove the equipment from the case it is only necessary to remove the eight screws along the right and left sides of the front panel. The entire chassis and front panel assembly is then removed as a unit.

To facilitate replacement of major components (such as tubes) a parts location diagram is included in this section.

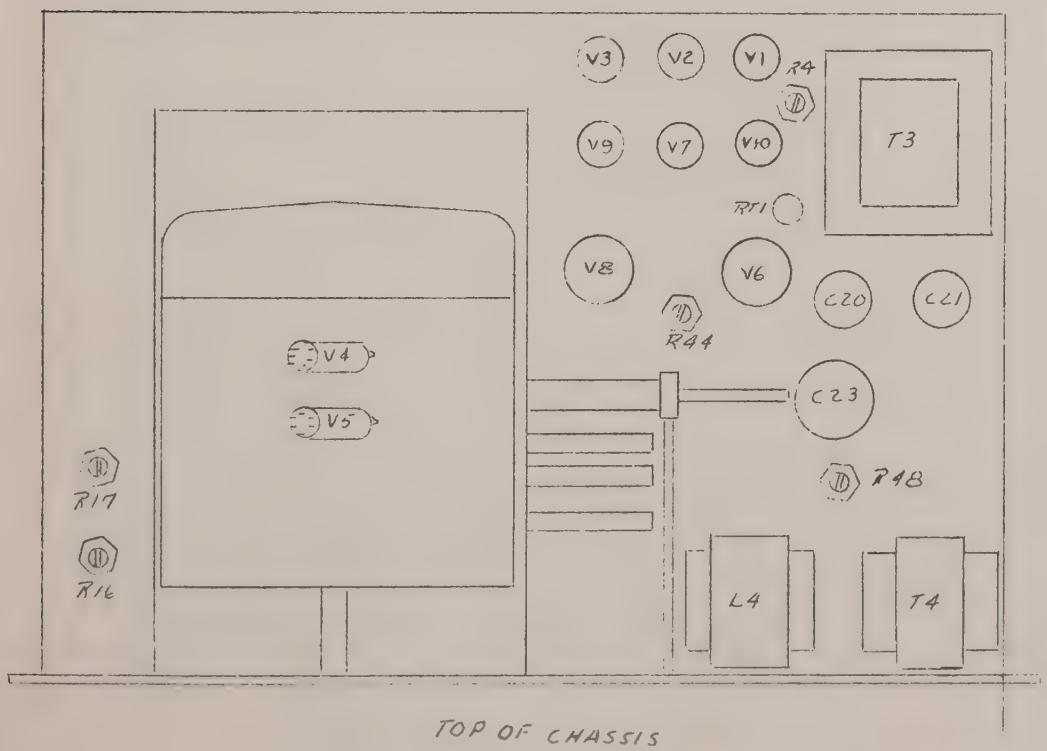


TABLE OF REPLACEABLE PARTS

Circuit Reference	Description	Manufacturer	Part No.
	Vernier Dial	NLIC	401-A-079
	Delta "F" Dial	NLIC	401-A-080
	RF Cable Assy	NLIC	401-B-097
	RF Cable Assy	NLIC	401-B-098
M2	RF Output Meter Scale	NLIC	401-A-021
M1	KC Deviation Meter Scale		
S1	Switch	NLIC	401-A-144
S2	Switch, Toggle DPDT	AH&H	Type 20510
S3	Switch, Toggle SPST	AH&H	Type 20510
T3	Transformer, Power	SNC	P2225
T4	Transformer, Filament	Thordarson	T-26F60
CR-1	Rectifier	Bradly	CX14E2D
CR-3	Rectifier, Selenium	Federal	1017
	Clamp	Mallory	VR-3
	Light Indicator	Dialco	18-11
	Lamp 3 Watt 120V Candelabra Base	GE	
	Crystal Diode IN 21		
F1	Fuse	Littlefuse	312001
	Fuseholder, Black	Bussman	HKP
L4	Choke	Thordarson	T20C53
L2,L3	Choke, 0.47 UH	IRC	Type CLA
	Choke, 0.82 UH	IRC	Type CLA
	Choke, 1.0 UH	IRC	Type CLA

TABLE OF REPLACEABLE PARTS

Circuit Reference	Description	Manufacturer	Part No.
	Resistors, Fixed Composition		
R6	RC20BF823K		
R7	RC20BF562K		
R8	RC20BF105K		
R9	RC20BF511K		
R11	RC20BF184J		
R12	RC20BF222K		
R13	RC20BF513J		
R14	RC20BF103J		
R19,R38	RC20BF102K		
R20,R43	RC20BF104K		
R21	RC20BF393J		
R22	RC20BF151K		
R23	RC40BF153J		
R25	RC20BF123J		
R26	RC40BF102K		
R27	RC20BF122K		
R28	RC40BF102K		
R29,R32	RC20BF150K		
R30,R31	RC20BF822K		
R33,R34 R35	RC20BF101K		
R36	RC20BF561K		
R37	RC20BF510J		
R39	RC20BF474K		

TABLE OF REPLACEABLE PARTS

Circuit Reference	Description	Manufacturer	Part No.
R40,R46	RC20BF683K		
R41,R45	RC20BF473K		
R42	RC20BF103K		
R101	RC20BF510J		
R201	RC20BF390J		
R202	RC20BF100J		
	Resistors, Variable		
R4,R16, R17,R48	RV3ATSA502B		
R10,R47	RV3ATRD254B		
R24	RV3ATRD503B		
R44	RV3ATSA254B		
	Resistors, Deposited Carbon		
R1,R5	RN20X1023F		
R2,R3	RN20X6762F		
R18	RN20X2201F		
R49	Resistor, Wirewound 2.2 Ohm, 1 Watt		
C7	Capacitor, MICA .002 MFD 300V ±5%	El-Menco	CM20-202
C2,C3	Capacitor, MICA 3900 MMF, CM25A392J		
C1, C8	Capacitor, Paper Die .25 200V ±20%	C-D	Budroc ST-2P2
C22	Capacitor, Paper Die .1 MFD 600V ± 20%	C-D	Budroc ST-2P1
C4	Capacitor, DISC .01 MFD 200V, CK63Y103Z		

TABLE OF REPLACEABLE PARTS

Circuit Reference	Description	Manufacturer	Part No.
C14	Capacitor, Disc Ceramic 4700 uuf	Elec Reactance	Hi-Q
C18,C19	Capacitor, DISC Ceramic .001 MFD 500V ± 20%	Erie	
C5	Capacitor, Metalized Paper .5 MFD 200V	Astron	MLL-25
C6	Capacitor, Metalized Paper 2MFD 200V ± 20%	Astron	MRF2-2M
C9,C10	Capacitor, Elec. Tube 10 MFD 25V AXIAL Lead	Sprague	16D10
C23	Capacitor, Elec. Tube 1000 MFD 25V	Mallory	HC 2510
C20,C21	Capacitor, Oil Filled 4.0 MFD 600V	Sangamo	CP41B1EF405V
C12,C13	Capacitor, Tubular Ceramic 10 uuf ± 10% Temp Coefficient No. 30	Elec Reactance	Hi-Q Type S1
C15,C16	Capacitor, Standoff Ceramic 5000 uuf ± 20%	Centralab	S2-502
C17	Capacitor, Button 1000 uuf ± 20%	Erie	370-CH
	Capacitor, Button 200 uuf ± 20%	Erie	370-CH
	Capacitor, Button 100 uuf ± 20%	Erie	370-CH
	Capacitor, Button 4000 uuf ± 20%	Erie	370-CH
	Capacitor, Feed Thru 100 uuf	Centralab	DA-817XL
	Capacitor, Feed Thru 2300 uuf	Centralab	DA-817XL

TABLE OF REPLACEABLE PARTS

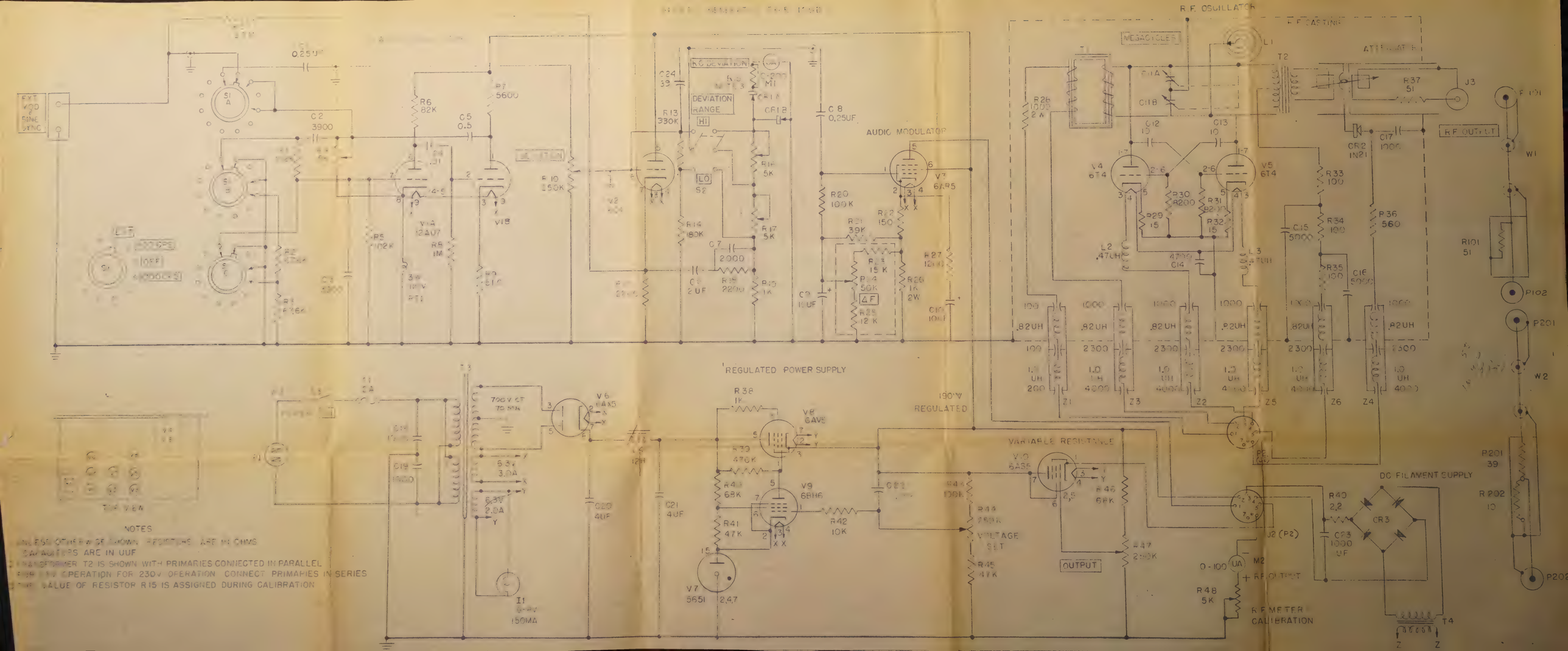
Circuit Reference	Description	Manufacturer	Part No.
V1	Tube, 12AU7		
V2	Tube, 6C4GT		
V3	Tube, 6AR5GT		
V4,V5	Tube, 6T4		
V6	Tube, 6AX5		
V7	Tube, 5651GT		
V8	Tube, 6AV5GT		
V9	Tube, 6BH6GT		
V10	Tube, 6AS5GT		

VOLTAGES TO GROUND
AS MEASURED WITH H.P 410B

Circuit Ref	PINS 1	2	3	4	5	6	7	8	9	Remarks
V1	160		4.2	FIL	FIL	60		2.3	FIL	Mod Freq. Switch at 1000
V2			FIL	FIL	200		35			
V3	28.5	35	FIL	FIL	175	200	30			
V4	22.5 to 110*	-4.1	6.3	6.3	.46					* Min to Max setting of output knob
V5	22.5 to 110*	-4.1	6.3	6.3	.46					
V6		FIL	340AC		340AC		FIL	350		
V7	87.5				87.5					
V8	190	FIL	200	155	320		FIL	320		
V9	85	86	FIL	FIL	190	180	86			
V10	77	64	FIL	FIL	64	200	200			

RESISTANCE TO GROUND

V1	180K	1 MEG	510	∞	∞	220K	40K	600	∞	
V2	180K	∞	∞	∞	160K	100K	2.2K			
V3	120K	1200	∞	∞	160K	160K	21K			
V4	∞	8.2K			15	8.2K	∞			
V5	∞	8.2K			15	8.2K	∞			
V6	∞	∞	210	∞	∞	∞	∞			
V7										Do not measure
V8	∞	∞	160K	150K	∞	∞	∞			
V9	135K									With B+ Set for 200V
V10		150K			150K	160K	160K	∞		


R.F. OSCILLATOR
R.F. CASTING
MEGACYCLES
ATTENUATOR
AUDIO MODULATOR
R.F. OUTPUT
REGULATED POWER SUPPLY
190 V REGULATED
VARIABLE RESISTANCE
VOLTAGE SET
OUTPUT
DC FILAMENT SUPPLY
R.F. METER CALIBRATION
TOP VIEW
NOTES
UNLESS OTHERWISE SHOWN RESISTORS ARE IN OHMS
CAPACITORS ARE IN UUF
TRANSFORMER T2 IS SHOWN WITH PRIMARIES CONNECTED IN PARALLEL
FOR 115V OPERATION FOR 230V OPERATION CONNECT PRIMARIES IN SERIES
THE VALUE OF RESISTOR R15 IS ASSIGNED DURING CALIBRATION

WARRANTY

The New London Instrument Company warrants each of its instruments to be free from defects in materials and workmanship. Our responsibility is limited to adjusting instruments and repairing or replacing defective parts (except tubes, fuses, batteries) for a period of one year after shipment when, in our opinion, such work is covered by this warranty. Warranty on tubes, fuses, and batteries depends on the warranty of the original manufacturer. The New London Instrument Company shall under no circumstances be liable for loss of profit or other damages.

SPECIFICATION CHANGES

The New London Instrument Company retains the right to discontinue any instrument without notice and to change specifications without responsibility for incorporating changes in instruments already sold.

REPAIRS

The New London Instrument Company maintains stocks of repair and replacement parts. If the customer wishes to return an instrument for repairs, permission should be obtained from our factory or one of our accredited representatives.

In returning an instrument, the customer should state the difficulties experienced. Reference to specific parts, especially by circuit diagram designation, is always helpful.

NEW LONDON INSTRUMENT COMPANY, INC.

New London, Connecticut

GROUND COMMUNICATIONS SECTION

13 January 1958

NEW LONDON INSTRUMENT COMPANY, INC.
12 Union Street
New London, Connecticut

PRICES

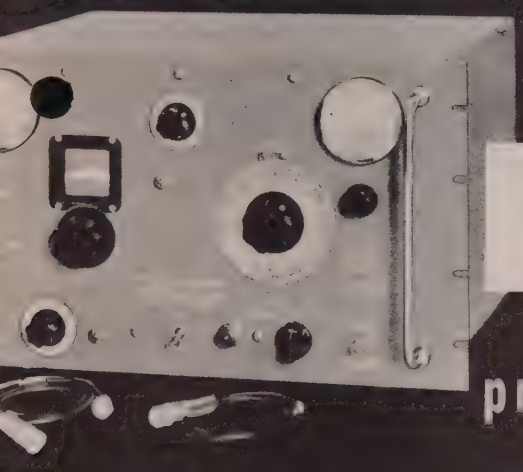
MODEL		PRICE	
Model 100D	Signal Generator	$ 995.00	(Special frequency ranges by factory quotation. These average $1800. to $2000.)
Model 155	Signal Generator	$1350.00	(w/o accessories or transit case)
Model 160	Broadband Amplifier	$ 290.00	
Model 183	Square Wave Generator	$ 385.00	
Model 252	AM Modulation Monitor	$ 795.00	
Model 257A	FM Modulation Monitor	$2850.00	
Model 462	Attenuator	$ 140.00	
Model 701	Frequency Standard	$1485.00	
Model 901A	Transconductance Analyzer	$ 995.00	
Model 162	Signal Generator	$ 750.00	(w/o accessories and cover)

The following instruments are no longer manufactured:

#175 UHF-VHF Noise Source
#191 UHF Noise Source
#403 Random Noise Source
#400 Transistor Multimeter

Prices subject to change without notice

Prices are F.O.B., New London, Connecticut



NEW LONDON INSTRUMENT Company INC.

presents a new line of

precision electronic test equipment

with "designed-in" accuracy, simplicity, versatility

TRANSCONDUCTANCE ANALYZER and CIRCUIT DESIGNER Model 901A

SPECIFICATIONS:

0-50,000 micromhos in six ranges. Four continuously variable DC power supplies regulated to 1% for plate, screen, suppressor and grid. Plate supply 0-300V at 200ma.
AC and DC filament supply. Voltage controls direct reading.
Four multi-range current meters.

FEATURES:

Inherently stable calibrating circuit, ± 5% accuracy of GM measurement; convenient matrix of color coded push-button switches for rapidly connecting any electrode to any power supply. Binding posts with shorting links in series with each tube pin permit insertion of active and passive circuit elements and external metering. This feature replaces breadboarding of many vacuum tube circuits.

USES:

Performs transconductance, short, gas, VR, emission, leakage and noise tests. Facilitates rapid design of vacuum tube circuits. **$895.00***

TRANSISTOR MULTIMETER MODEL 400

SPECIFICATIONS:

Voltage Ranges (full scale):
At 200,000 ohms/volt DC and AC:
0.03, 0.1, 0.3, 1.0, 3.0, 10.0, 30.0, 100.0, 300.0, 1000.0

Ohms Midscale: 1, 10, 100, 1000, 10,000 100K, 1M

Accuracy: DC 2%, AC 3%

Frequency Response: AC voltmeter, 10 cps to 5 kc

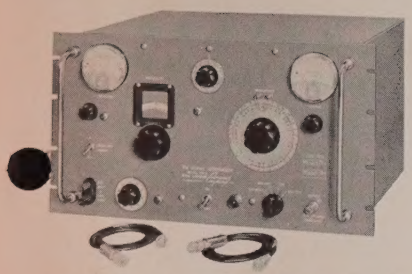
FEATURES:

This portable, highly sensitive, transistorized volt-ohmmeter is particularly adaptable for reading voltages as low as 1 millivolt with very high input impedance. The Model 400 can replace many non-portable VTVM's and VOM's opening new fields of measurement.
The use of transistors extends battery life to greater than 350 hours of continuous duty — direct reading of very low resistances eliminates the use of time consuming bridges **$140.00***

SIGNAL GENERATORS

NOISE SOURCES

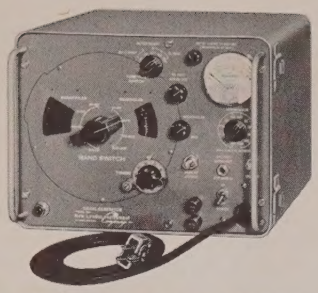
AMPLIFIERS & MODULATION MONITORS



FM SIGNAL GENERATORS SERIES 100

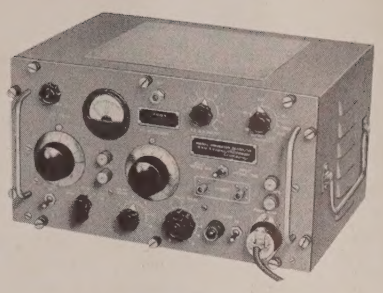
MODEL 100B-18 to 110MC. MODEL 100D-27 to 230 MC. Special designs up to 500MC. Deviation: 0-30KC and 0-250KC; **Accuracy:** ± 5% F.S. at 1000CPS also special ranges; **Distortion:** less than 2% at 100KC, much lower available to special order; **Output Voltages:** 0.02 to 100,000 microvolts using two terminated cables; Precision piston attenuator ± 10% accurate; **Features:** Low leakage, distortion, drift and spurious output.

Standard models **$885.00***



AM SIGNAL GENERATOR MODEL 162

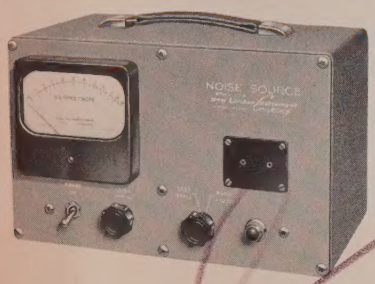
Frequency Range: 10KC to 50MC in 9 bands; **Frequency Calibration Accuracy:** ± 0.5%; **Internal Modulation:** 400 and 1,000CPS, 0 to 50% mod.; **External Modulation:** 0 to 80%, up to 15KC mod. frequency; **Output Voltages:** Var. 0.1 to 100,000 microvolts at 50-ohms and 1 volt at 500-ohms. **Attenuator:** Ladder & variable pad, 10% accuracy; **Distortion:** Less than 7% at 50% mod.; **Features:** Built-in crystal calibrator, negligible FM, drift & leakage. A highly portable unit. **$515.00***



SIGNAL GENERATOR MODEL TS155

Frequency Range: 2700-3400MC in three ranges; **Output:** —20 to —100 dbm at 50-ohms using piston attenuator; **Modulation:** Pulse internal or external trigger —95 dbm; **RF Pulse Shape:** Rise: less than .35 μsec; **Duration:** 0.7 to 12 μsecs ± 10%, flatness 5%; For testing of pulse receivers and transmitters. Thermistor bridge can be connected to directly measure incoming rf power up to 200MW.

$1200.00*



F-VHF NOISE SOURCE MODEL 175A

Frequency Range: 50 to 900MC; **Noise Figure:** 0 to 19db; **Accuracy:** ± 0.5db below 400MC, ± 1db max at 900MC when using 300-ohm equipment; **Output Impedance:** Designed for 300-ohm balanced loads; **Features:** Quickly measures noise figure and gain of TV & FM tuners & receivers. Reads directly in db. No balun required; Long life, inexpensive noise diodes; No tuning required. **$285.00***

UHF NOISE SOURCE MODEL 191

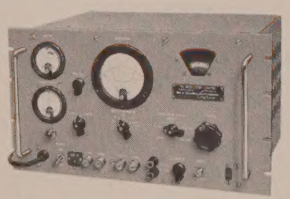
Frequency Range: 3 to 3000MC; **Noise Figure:** 0 to 20 db; **Output Impedance:** 50-ohms unbalanced; **Meter Calibration:** Linear in db; **Filament Voltage:** Highly regulated; **Features:** Measures noise figure & gain of receivers; calibrates signal sources; low VSWR; no tuning required; automatic cut-off prolongs diode life. Smith chart supplied. **$750.00***

RANDOM NOISE SOURCE MODEL 403

Frequency Range: 3 to 500MC; **Noise Figure:** 0 to 19db direct reading; **Accuracy:** ± ½db over entire frequency range; **VSWR:** below 1.3 over entire frequency range; **Output Impedance:** 50-ohms unbalanced; **Features:** Measures noise figure, bandwidth & gain of receivers, calibrates signal sources; high accuracy; low VSWR; long life, inexpensive noise diodes; no tuning required. **$285.00***

BROADBAND AMPLIFIER MODEL 160

Frequency Response: 15KC to 50MC (3db points); **Gain:** 60db into 1000-ohm load. Cont. var. over 20db range; **Output:** 18 volt p-p into 1000 ohms; **Rise Time:** .010 microseconds; **Impedances:** Input—nominally 1000 ohms; Output—1000 ohms; **Features:** For general purpose lab work; amplifies low-level counter [illegible]es; increases sensitivity of oscilloscopes [illegible] voltmeters; facilitates ultrasonic delay line measurements; used as post amplifier in noise measurements. **$290.00***



FM MOD. MONITOR MODEL 257A

Carrier Frequency Range: 20 to 1000MC in 5 bands; **Deviation Ranges:** 0 to 1000KC in 5 bands, direct reading; **Deviation Accuracy:** ± 5% for 0 to 200KC & ± 10% for 200 to 1000KC deviations; **Input Sensitivity:** Better than 10MV from 20 to 500MC, 20MV from 500 to 1000MC; **Audio Frequency Response:** ± 1 db from 50 to 70,000CPS; **Uses:** Measuring frequency deviation, carrier noise, hum & Mod. distortion of transmitters & signal generators. Measuring FM of AM transmitters. Monitoring TV, FM & telemetering transmitters. **Features:** Wide RF and deviation range; wide audio response; low internal hum, noise & distortion; insensitive to 30% spurious AM. **$2400.00***

AM MOD. MONITOR MODEL 252

Frequency Range: 100-225 or 225-400MC or special ranges; **Modulation Range:** 0 to 100% positive or negative; **Accuracy:** ± 2% at 0% & 100% mod. of 1000CPS; ± 4% at other values; **Overmodulation Indicator:** Flashing light indicates modulation over pre-set value; **Audio Monitoring Output:** Approx. 1V across 600-ohms, response 20-45,000CPS ± 1 db; **Fidelity Measuring Output:** Approx. 10V across 0.1 meg. response 20-30,000CPS ± 1 db; **Features:** Direct accurate reading; overmodulation indicator; low noise and distortion; output monitoring circuit **$750.00***

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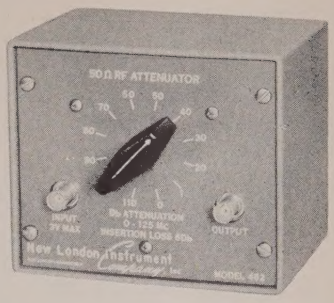
FREQUENCY STANDARDS & ATTENUATORS

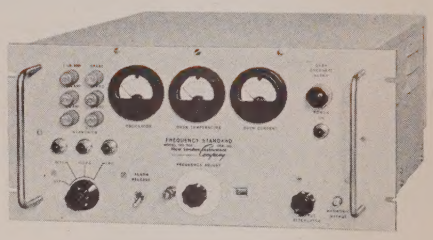
RF ATTENUATOR MODEL 462



Frequency Range: DC to 125MC; **Attenuator:** 0 to 110db in 10db steps; **Accuracy:** ± ½db; VSWR: 1.2 at 125MC; **Impedance:** Source & output — 50-ohms; att. input — 150-ohms; **Features:** Ladder type, step attenuator with 12 position switch; minimum leakage due to heavy cast construction. Convenient compact size for production and laboratory applications. Available in special ranges & as your equipment component.

$59.00*

FREQUENCY STANDARD MODEL 701



Crystal Oscillator Frequency: 1MC; **Output Frequencies:** 10 to 50MC at intervals of 10KC, 100KC and 1MC; **Output Voltage:** 200 microvolts into 50-ohms up to 20MC; 10 microvolts into 50 ohms up to 50MC; 2 volts into 50 ohms with 100KC sine wave, no attenuator; **Frequency Stability:** After 48 hours of continuous operation (1) 1 part in 10^7 per 24 hours (2) 1 part in 10^7 for ± 10% line voltage change, (3) 1 part in 10^8 per degree Centigrade; **Features:** Excellent source of highly stabilized frequencies. For nuclear resonance measurements and determination of crystal frequencies.

$1485.00*

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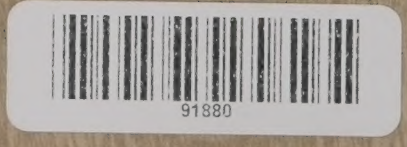
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